

# STAR★TECH

The Technical And  
Informational Monthly  
For The Coin-Op Industry

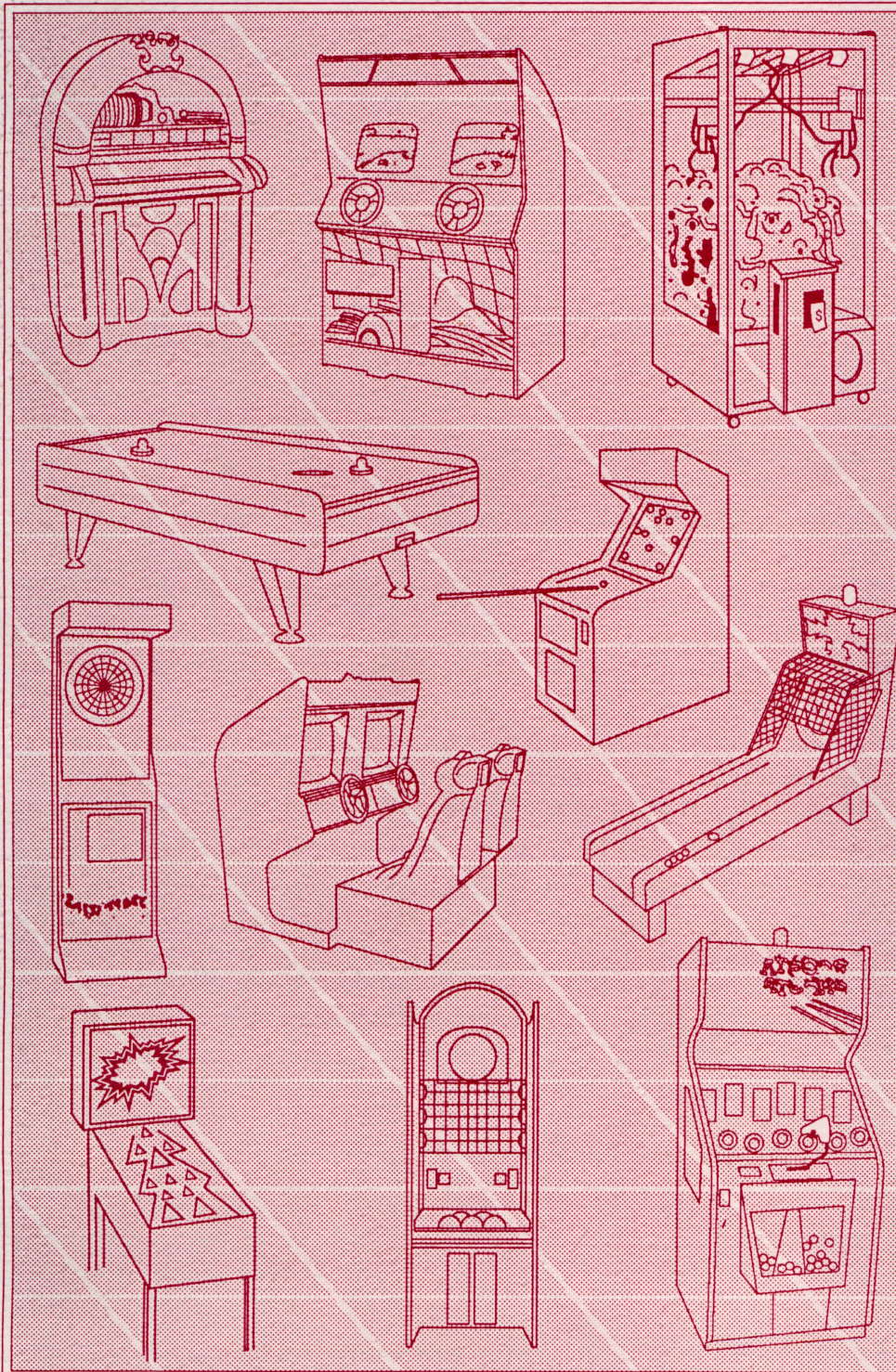
## Journal

August 1991

Volume 13, Number 6

☆☆☆ CONTENTS ☆☆☆

- Williams *Slugfest* Pitching Problems 4
- Midway *Dr. Dude* Heart Target 4
- Williams *Fun House* Flipper Rubber 4
- Midway *Gilligan's Island* Ramp 4
- Cellular Telephone Static Cures 6
- Williams Programs Out Hardware Failures 6
- Use Circuit Breakers Instead Of Fuses 7
- Greenwald Coin Chutes 7
- AMOA Nominations 8
- Atari *Tempest* Shorting Pins 9
- Series/Parallel Flipper Conversion Response 10
- Atari *Road Riot* Is UL Listed 10
- Williams Rejectors 11
- Industry's Worst Cue 12
- Betson Crane Diodes 12
- Data East Pin 5th Anni 12
- Install A Ticket Advance Pushbutton 14
- Merit Pie Segments 16
- Evaluating SNK's *NEO•GEO* 18
- Wms Sys II Diagnostic 20





## NEW SERVICE MANUALS

**ADVANCED TROUBLESHOOTING**

Based on *STAR★TECH Journal's* highly successful national seminar program for the advancing game technician. This manual is designed to advance the service person in the skills of troubleshooting & repair of coin-operated games. The most in-depth manual ever written on Monitors, Power Supplies, Logic Board Diagnosis, Pcb Bench Repair, Problem Isolation Techniques, Troubleshooting Logically, Preventive Maintenance, Proven Quick Fixes, Test Equipment & Repair/Rework Tools, Gathering Valuable Technical Information and much, much more! Excellent for shop and/or home study. Upgrade your technical skills with current electronic troubleshooting procedures. No technical library is complete without this all-new coin-op game service manual. \$49.95.

**HOT TIPS I: Bench Tech**

Keep this valuable reference manual nearby on your workbench—you will use it! A compilation of "hand picked" *STAR★TECH Journal* articles plus additional time-saving tech tips from service managers around the country. Arranged by game manufacturer, alphabetically. Special plastic comb binding allows handbook to lay flat on your bench, freeing both hands for the job. And sized at 5 1/2" x 8 1/2" it won't clutter your work area. \$29.95.

**HOT TIPS II: Field Tech**

Don't leave home without it! Just like *HOT TIPS I: Bench Tech*—except for this special issue manual, we had veteran field service people select the most helpful *STAR★TECH Journal* articles and add some of their own great tech tips! Geared toward the tech/mech doing service on location, as opposed to shop repair with the luxuries of time and resource materials. Arranged by game manufacturer, alphabetically. Special plastic comb binding allows handbook to lay flat, freeing both hands for the job. This sturdy 5 1/2" x 8 1/2" handbook will fit comfortably into your toolbox. \$29.95.

Rush me \_\_\_\_\_ **Advanced Troubleshooting** \$49.95

Rush me \_\_\_\_\_ **HOT TIPS I: Bench Tech** \$29.95

Rush me \_\_\_\_\_ **HOT TIPS II: Field Tech** \$29.95

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City/State/Zip: \_\_\_\_\_

☐ **Payment Enclosed**      ☐ **COD**

Please include \$3.50 s/h. NJ add 7%.

Mail coupon to: *STAR★TECH Journal*, PO Box 1065,  
Merchantville, NJ 08109. stj

## MORE SERVICE MANUALS

**BEST OF STAR★TECH JOURNAL: MONITORS**

From 1979 to 1989. Ten years of video monitor service tips and symptom/solutions! This manual belongs on every service bench. Everything from Theory-of-operation to Troubleshooting is covered for black & white models, X-Y types and color monitors (US & foreign). Including common failure modes, specific component failures, suitable replacements, testing methods, isolation techniques, modifications and enhancements for most every video monitor ever used in the Coin-Op Amusements Industry during the past ten years! 120 pages, arranged so that you can easily find the monitor you want by Game manufacturer & Monitor manufacturer. Price: \$49.95.

**1990/'91 UPDATES: S★TJ'S MONITOR MANUAL**

All monitor articles covered in 1989/'90 or 1990/'91 published in a handy format. Over 25 new video monitor Symptoms and Fixes in each which appeared in *STAR★TECH Journal's* Volume 11 or 12. Update your technical library with these valuable reference texts. Price: \$12.95 each.

**ELECTRONIC GAME REPAIR**

Instructional and reference manual covering such subjects as: Basic Electronics, Semiconductors, Video Game Systems, Electronic Pinball Systems, Troubleshooting Techniques, Tools and Test Equipment, Schematic Reading and more. This 8-1/2" x 11" manual contains 65 pages of technical info for the servicing of electronic games and is priced at \$24.95.

**INSIDE POWER SUPPLIES**

This manual is loaded with information on power supplies. Written by James Beck of BAM Engineering, edited by James Calore and published by *STAR★TECH Journal*. Every type of power supply is covered; including linear and switch mode. Power supply components, transformer and filter arrangements, high current supplies and troubleshooting is also presented in this very comprehensive manual. 32 pages. Price: \$24.95.

Rush me \_\_\_\_\_ **Best Of S★TJ: Monitors** \$49.95

Rush me \_\_\_\_\_ **1990 Update: Monitors** \$12.95

Rush me \_\_\_\_\_ **1991 Update: Monitors** \$12.95

Rush me \_\_\_\_\_ **Electronic Game Repair** \$24.95

Rush me \_\_\_\_\_ **Inside Power Supplies** \$24.95

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City/State/Zip: \_\_\_\_\_

☐ **Payment Enclosed**      ☐ **COD**

Please include \$3.50 s/h. NJ add 7%.

Mail coupon to: *STAR★TECH Journal*, PO Box 1065,  
Merchantville, NJ 08109. stj



# STAR★TECH Journal

P.O. Box 1065  
18 North Centre Street  
Merchantville, NJ 08109

Phone: 609/662-1080  
Fax: 609/662-0537  
BBS: 404/631-2928

**Publisher/Editor:** James Calore  
**Office Manager:** Sharon Iocono

**Contributors:** John Michael Bevar  
Charles Bleich  
Dave Bushey  
Larry DeMar  
Bill Eaton  
Todd Erickson  
Vic Fortenbach  
Bill Johnston  
Jim Kelly  
Kevin M. Kubek  
Donald B. Prince  
Kingsley Sime  
Evan Wessel  
Erik Wittenzellner

**STAR★TECH Journal**, August, 1991, Volume 13, Number 6, Copyright ©1991 by StarTech Journal, Inc. All rights reserved. Information contained herein is verified whenever possible but S★TJ is not responsible, however, for damages which may occur from implementing this information. Address inquiries to: PO Box 1065, Merchantville, NJ 08109. Phone: 609/662-1080. Subscription rates: USA \$67.00. Canada \$76.00 (US funds). Other Countries \$120.00 Air Mail (US funds).

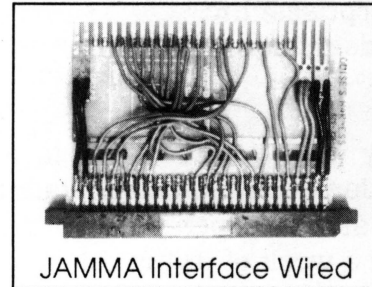
**POSTMASTER:** Send address changes to **STAR★TECH Journal**, PO Box 1065, Merchantville, NJ 08109. **STAR★TECH Journal** (ISSN 0739-1048) is published monthly by Star Tech Journal, Inc., 18 North Centre Street, Merchantville, NJ 08109. Second Class postage paid at Camden, NJ.

## CUSTOM/8 LINE WIRE HARNESSSES

☆ Made To Order ☆

**Harnesses • Interface Boards • Color Conversion Pcb**

### JAMMA Generic Harnesses

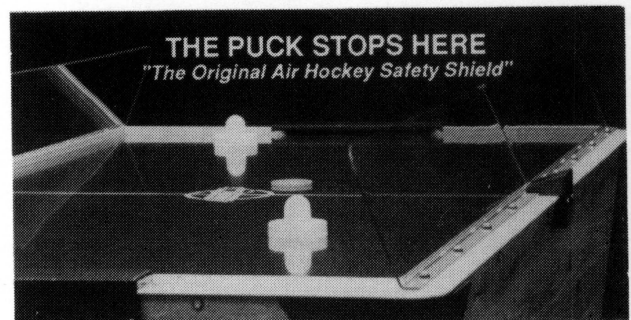


#### Conversions Made Simple With Interface Boards

Double Male Interface Board with JAMMA pinout one side and choice of either 28/56, 22/44 or 18/36 on other side @ \$12. Male/Female Interface Board with male JAMMA pinout on one side and choice of 28/56, 22/44 or 18/36 female connector on other @ \$15. 8 line tails @ \$20. 8 line generic complete with terminations @ \$26.50. Boards wired to your pinout \$7. **Nintendo Monitor Color Conversion PCB**, instructions furnished \$22. Quantity prices on request. Prices subject to change without notice.

#### LOUISE'S HARNESS SHOP INC.

712 County Rd. 58, Prattville, AL 36067.  
800/365-1941. 205/365-1841. Fax: 205/365-4435.



- Practically eliminates table-side injuries!
- Practically eliminates costly property damage!
- Doesn't affect table play.
- Installs in 15 minutes with only a screw driver.

\*\*\* ALSO AVAILABLE FOR U.S. BILLIARDS! \*\*\*

**Increases Player Appeal! Arcade Tested!**

1000's IN USE  
In 5 Countries on Three Continents

Made From Virtually  
**INDESTRUCTIBLE SPACE-AGE MATERIAL!**  
**LIFETIME REPLACEMENT GUARANTEE**  
**ACCEPT NO SUBSTITUTES!**

**ORDER TODAY!**

**800/933-0145**



## Williams Slugfest Pitching Problems

Erik Wittenzellner, Service Manager  
Kemp Enterprises, Inc.  
South Windsor, Connecticut

### PROBLEM

We recently received a *Slugfest* in our shop to make location ready. Upon installation at the location we started experiencing pitch problems. After about a week of trying this and that to fix the erratic pitches, I decided to call Williams. After describing the problem, they told me to check the playfield.

### CAUSE

It turns out that the playfield is made of plastic and if moved into the sun, it can warp slightly causing this problem.

### SOLUTION

To solve the problem, I drilled and countersank a small flathead screw directly in front of the pitch exit flap which brought the playfield back to flat and solved the problem.

## Midway Dr. Dude Heart Target

Evan Wessel  
Mercury Amusement  
Havertown, Pennsylvania

### SYMPTOM

I've had repeated problems with this feature target on both of my *Dr. Dudes*. The target gets struck very hard and the rivets holding the switch blades loosen up. The target blade will then jam holding the target closed.

### SOLUTION

Drill out the rivets and then nut and bolt the target assembly together. This will keep it in proper alignment.

### NOTE

The mounting position and short distance from the flippers makes this a particular problem for *Dr. Dude*.

## Wms Fun House Flipper Rubber

Todd Erickson  
Summit Amusements  
St. Paul, Minnesota

### PROBLEM

The upper flipper has been hitting the ball guide and cutting the flipper rubber on some games.

### SOLUTION

If you see a mark on the flipper rubber, trim or adjust the ball guide.

## Midway Gilligan's Island Ramp

Kingsley Sime  
K. Sime Machines  
Lancashire, England

### PROBLEM

So far we have sited two *Gilligan's Islands* and have had service calls to both games for the same fault: The 'island' on both tables is slightly lower than the top of the ramp leading to it.

### SOLUTION

The cure is not quite as simple as it looks on first glance. If you raise the island only slightly you will find that it will miss the light sensor underneath. You need to raise both the island and the small light sensor board to be effective.





# "I'd Rather Fix Them Than Play Them."



By Darl E. Davidson  
Vice President of Operations  
Data East USA, Inc.

As a 10-year participant in the coin-op marketplace, it's been fascinating to witness the light-speed evolution of game technology. Every season that goes by brings forth bigger and bolder products for the ever-fickle game players that are our industry's life-blood.

Naturally, there is a downside to the non-stop technology advances: Keeping all these new super-duper-whiz-bangs up and running has become increasingly difficult—and crucial to the financial stability of our industry. Remember that a machine out-of-order take up floor-

## The Data East Technical Support Hotline is 800-634-7270.

space without contributing anything toward the bottom line. As a result, today's coin-op manufacturer must provide their customers' field repair technicians with immediate and direct access to a dedicated technical-support network.

At Data East, our company policy is clear: We will not release a product until our technical-support department has thoroughly examined every possible area of repair—primarily those systems bound to degrade over time due to usage and wear—and has established a clear-cut chain of support for that product.

For example, we recently shipped Cosmogang, a highly successful redemption product that on first sight can prove quite intimidating: Light-gun technology and countless moving parts packed into a 10-foot long cabinet. That's why we must do every thing in our power to help repair technicians unfamiliar with this type of game feel comfortable and confident about the task at hand. Data East accomplishes this through a three-phase support process:

- **Resilient Game Design**

Before Cosmogang even went on the assembly line, we had already gone through numerous prototypes to determine the sturdiest, most reliable way to construct the unit.

- **Technical Support 800-Hotline**

Data East manages one of the industry's highest-regarded technical-support Hotlines—staffed by highly qualified support personnel trained to handle any manner of request. The Data East Technical Support Hotline is 800-634-7270.

So if you see "Data East" on the machine, remember that we're there whenever you need us—for whatever you need us.



We've Got It All.



## Cellular Telephone Static Cures

Bill Johnston  
Johnston Video  
Buffalo, New York

### SUBJECT

Service tip for your mobile phone. In our van, increasing problems of static noise on the cellular phone was making me crazy.

### SYMPTOMS

I went through the system for antenna problems and reset with power problems, etc, with no luck.

This went on for months while I avoided the inevitable high-cost service call, expecting a \$120 bill for what is now a \$1 phone (with a 12-month contract, of course).

### SOLUTION I

Turns out to be a corroded battery terminal in the van. Cleaned it up and now the cellular phone has absolutely static-free clarity again, just like when it was new 5 years ago.

I feel just a little bit dumber and smarter at the same time. So, I guess that whether it's a video game or a cellular phone, check the power supply.

Evan Wessel  
Mercury Amusement  
Havertown, Pennsylvania

### SOLUTION II

Glass mounted cellular antennas are the cause of most static and disconnects. As soon as I went roof mount, my problems almost disappeared.

## Wms Programs Out Hardware Failures

Larry DeMar  
Williams Electronics  
Chicago, Illinois

### SUBJECT

For the problem of "what to do while you're waiting for the part". In the case of the *Fun House's* Trap Door, as well as the Steps Gate and Rudy's Mouth, there are adjustments to disable these mechanisms, and compensate in the software.

### PROCEDURE

These adjustments are the last few in the "feature adjustment" menu.

- For the Trap Door, you need to cover up the hole, and set "Disable Trap Door" to "yes". The game will not try to operate the door, and will use the switch above the door to indicate a hit.
- If you lose a Rudy Jaw gear, set "Disable Rudy Jaw" to "yes" and force his mouth open. The game will not operate the Rudy Jaw motor.

### FACTORY POLICY

Our software staff is constantly trying to come up with new ways to keep the games running, while reporting problems that we come across. We also try to design game rules with the possibility of component failure in mind to make sure the player can still get most or all of the major features as different parts stop working.

We are also striving to limit the failures through better mechanical design and quality control, but it never hurts to have a really large safety net.

It has been a company-wide policy to program the games in this manner. Its a philosophy that we started on *High Speed*, and have been refining ever since.

### Phone & Fax

See page 21 for updated manufacturer customer service phone & fax numbers.





## Use Circuit Breakers Vs Fuses

Erik Wittenzellner, Service Manager  
Kemp Enterprises, Inc.  
South Windsor, Connecticut

### PROBLEM

One of the most aggravating things that a technician can have happen is to replace a blown fuse, only to have it blow seconds after you install it.

### SOLUTION

I find that this can be expensive as well as an extreme hassle. To solve this problem, I have acquired some low amperage circuit breakers and put clip leads on them. I have several different values: 2 amp, 3 amp, 5 amp and 10 amp. I now use these while I'm troubleshooting the circuit instead of a box full of fuses.

### SOURCE

These breakers cost about \$5.00 to \$10.00 each and are an asset to any technicians box. They are available at most electronic stores and are manufactured by Potter & Brumfield. The part # is W58-XB1A4A-(Amp Rating).

## Endless Greenwald Coin Chutes

Todd Erickson  
Summit Amusements  
St. Paul, Minnesota

### PROBLEM

The ends have been breaking off the Greenwald coin chutes. They knew about the problem and added a metal support to some production units but never released it to the field.

### SOLUTION

If you have a breakage problem contact either Greenwald Industries at 800/221-0982 (Harry Silberglib) Valley, Dynamo or your local distributor for replacement.

## Beckman DM25XL Multimeter

**EASY TO USE, LARGE DISPLAY, LOW COST!**

- 29 RANGES
- BUILT-IN 20 MHZ LOGIC PROBE
- CAPACITANCE MEASUREMENT To 20 MFD
- RESISTANCE MEASUREMENT To 2000 MEGOHM • 10 AMP RANGE AC AND DC
- TRANSISTOR GAIN MEASUREMENT

**\$89**

Send check or money order to: **STAR★TECH Journal**,  
PO Box 1065, Merchantville NJ 08109. NJ add 7%.  
COD ok. Call 609/662-1080 or fax 609/662-0537.  
(All orders add \$8 s/h. Thank you!)

## SWITCHING POWER SUPPLIES

**New! Best of STAR★TECH Journal.** All about Switching Power Supplies. From the very beginning! Switchers are covered from when they first appeared in our Industry up to the current models and uses.

**Theory and Circuit Analysis.** Voltage Measurements, Substitute Parts and Failure Modes.

**Modifications.** Getting negative voltages from positive-only switchers, Identifying power legs on ICs, Capacitor Replacements.

**Troubleshooting.** Peter Chou, Condor, Wico, Power Plus, Nintendo, Sieracin, HiTron, Penn-Ray.

**Never before published** information outside of our journals. This info can not be found in any of our current service manuals.

*So, if you're looking for the definitive word on Switching Power Supply servicing and repair, this is it. Now, you can determine if that switcher is repairable or simply not worth your time. Look up the symptom, perform the solution and you're back in business. Take another look at that pile of useless supplies in the corner of your shop—are they really beyond help? Maybe not! \$29.95 (plus \$3.50 s/h) NJ add 7%.*

**STAR★TECH Journal PO Box 1065,  
Merchantville, NJ 08109. 609/662-1080**



# 1991 AMOA Awards Nominations

*Award winners will be announced and honored at the Amusement & Music Operators Association's 1991 Awards Show on September 13 in Las Vegas.*

## GAMES AWARDS (Nominated by AMOA members)

### **MOST PLAYED VIDEO GAME (DEDICATED)**

*Hard Driving Man* - Atari  
*Neo Geo* - SNK  
*Pit Fighter* - Atari  
*Race Drivin'* - Atari  
*Teenage Mutant Ninja Turtles* - Konami

### **MOST PLAYED PINBALL GAMES**

*Earth Shaker* - Williams  
*Elvira* - Bally  
*Fun House* - Williams  
*The Simpsons* - Data East  
*Whirlwind* - Williams

### **MOST PLAYED CONVERSION KITS**

*Bowling* - Capcom  
*Final Fight* - Capcom  
*Hi Impact* - Williams  
*Raiden* - Fabtek  
*Street Fight II* - Capcom

### **MOST INNOVATIVE NEW TECHNOLOGY**

*Checkpoint Pinball Dot Matrix* - Data East  
*F15 Strike Eagle* - MicroProse  
*Mad Dog McCree* - Betson  
*Neo Geo* - SNK  
*Pit Fighter Digital Pictures* - Atari  
*Putting Challenge* - Ice

### **MOST PLAYED DART GAME**

*Arachnid*  
*Merit*  
*Valley*

### **MOST PLAYED POOL TABLE**

*Dynamo*  
*Valley*  
*UBI*

### **MOST PLAYED JUKEBOX**

*NSM CD*  
*NSM Firebird (Wall Unit)*  
*Rowe CD*  
*Rowe (45rpm)*

### **MOST PLAYED REDEMPTION GAME**

*Big Choice* - Betson  
*Pop a Shot* - Pop a Shot  
*Shoot to Win* - Smart  
*Skee-ball* - Skee-ball  
*Super Single* - Smart

### **MOST POPULAR OTHER GAME**

*Air Hockey* - Dynamo  
*Foosball* - Dynamo  
*Foosball* - Tornado  
*Putting Challenge* - Ice  
*Shuffle Alley* - Williams





## Atari Tempest Shorting Pins

Kevin M. Kubek  
Superior Amusements  
Pinconning, Michigan

### PROBLEM

On Atari *Tempest*, I thought I had a monitor problem; too much brightness with retrace lines. After much work, I switched it with a known good one and had the same problem and worked on the board and found nothing wrong. I put in a known good board and still had the same problem.

### SOLUTION

Instead of one finger per wire in the edge connector, the fingers are split in two with two very thin fingers per connection. I found these bend over and shorting out others causing the above described problem.

## JUST DO IT!

**Don't Let Those Time & Money Saving  
Mod's, Fixes & Technical Tips  
Gather Dust In Your Service Files...**

Mail or fax them to STAR★TECH Journal & keep your name (and your company's) out in front with the most progressive technicians in the Coin-op Industry. *Share the knowledge!*

**STAR★TECH Journal**

PO Box 1065, Merchantville, NJ 08109

Phone: 609/662-1080 • Fax: 609/662-0537

## MURPHY'S LAW #1306

A fool and your money  
are soon partners.

## THE HUNT IS ON...



### ...For Your New Coin-op Customers!

Let STAR★TECH Journal's Master Mail List help you search for new customers. The List has just been cleaned and is now available for your rental order.

This is the most accurate and comprehensive mail list in the Coin-op Industry. All names not responding to one of our mailings in the last two years have been eliminated.

Call or fax S★TJ today for the most recent state totals and List totals.

**Phone: 609/662-1080 • Fax: 609/662-0537**

**F.Y.I.** STAR★TECH Journal pays for itself over and over again. One tech tip is worth a years subscription. It's as important as any tool in your shop. When your coin-op game goes down, turn to S★TJ to save yourself valuable time and money.

### Upcoming STAR★TECH Journal Regional Technical Seminars

Aug 10/11	STAR★TECH	San Francisco
Aug 17/18	Mt. Coin Dist.	Las Vegas
Aug 24/25	Cleveland Coin	Detroit
Sep 7/8	Music Vend Dist.	Seattle
Sep 28/29	STAR★TECH	Atlanta

For more information see page 24  
or call S★TJ at 609/662-1080.



## Series/Parallel Flipper Conversion

Charles Bleich  
Williams Electronics Games Inc.  
Chicago, Illinois

### TOPIC

Conversion of series flipper coils to parallel flipper coils.

### PROBLEM

The article by Shawn Puckett in the June 1991 *STAR★TECH Journal* on Series/Parallel Flipper Conversion is in error.

### REASON

The electrical schematic changes that he has described are correct but the magnetic fields will oppose each other between the power and holding windings. This configuration will work because the power difference of the holding vs power windings is very large. This will cause the coil to be weaker than its true capability during the power stroke. None of the real benefits for the design change will be obtained.

Since the Williams series coil has the common connection of the two winding on lug 2, the current will flow in opposite directions rather than in the same direction causing the magnetic fields of the two windings to oppose each other. *Therefore* subtracting energy instead of adding together.

### SOLUTION

Since it is a very difficult task to alter the winding termination it would be advisable, but not recommended, that a coil that has been wound for parallel use be employed.

### CONCLUSION

When converting a game, the power delivered by a coil can and will be different depending on the coil selected for the replacement. If a coil that is more powerful than the original one is installed, damage to other parts on the playfield will occur. It is always recommended that an exact replacement part be used.

## Atari Road Riot Is UL Listed

Bill Eaton  
NDI  
Santa Clara, California

### SUBJECT

Thank you Atari! Atari's new *Road Riot* is UL listed. Seeing that big "UL" sticker on the back of a cabinet is quite a thrill. This small sticker says "We Care" from beginning to end.

Trying to "after market" a listing is almost impossible. The requirements for that little sticker can be found on 33 very complex pages of UL22 (Underwriters Labs Reg). Other labs have provided similar standards based on this one.

### SAFETY & QUALITY

Underwriters Laboratories maintain some of the toughest listing standards in the world. Many other testing labs use UL standards to design their own. This seal not only guarantees a safe design but is often times a seal of quality.

In order to obtain a listing, *only* approved components can be used. *Inferior components* are automatically weeded out since most items of inferior quality won't pass the rigorous testing required for approval.

Approved components can be identified by a logo that looks like a combination of the letters U and R, but it is actually the logo for ANSI. By purchasing approved products and replacement components and maintaining the integrity of the equipment (especially three prong plugs and outlets) you will reap immediate benefits; like greatly reduced service costs, less down time and more sleep at night. This last benefit you'll need to carry the heavy money bags to the bank.

I never look gift horses in the mouth, but I am encouraged by this example. You should have little trouble identifying reputable manufactures in the near future, since they will soon follow suit.



# Williams Early Coin Rejectors

Todd Erickson  
Summit Amusement  
St. Paul, Minnesota

## PROBLEM

Early coin doors, manufactured by Williams for their pinballs, don't have enough through to actuate the rejector full swing. This causes a problem with Canadian coins not being wiped off and usually causing a service call.

## SOLUTION

I recommend using a plastic *Coin Acceptors* mechanism on one side. *Coin Controls* also has a new mech with no magnet that works excellent for this type of use.

I have had several occasions when there were two Canadian coins in the Williams pinball, placing the entire game out of order. Williams has corrected this problem on newer games.



## Yo! TECHS IN THE GREAT NORTHWEST

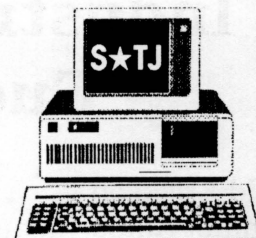
THIS IS YOUR LUCKY MONTH! *STAR★TECH JOURNAL*'S TECHNICAL SEMINAR ORIGINALLY SCHEDULED FOR JULY 13/14 HAS BEEN POSTPONED AND IS NOW RESCHEDULED FOR **SEPTEMBER 7/8**.

THIS SEMINAR IS AIMED AT ADVANCING TECHS AND WILL BE HELD AT **MUSIC VEND DISTRIBUTORS IN SEATTLE, WA**. (THE SEMINAR OUTLINE AND REGISTRATION DETAILS CAN BE FOUND ON THE BACK COVER OF THIS ISSUE.)

THIS IS THE BEST SEMINAR PROGRAM IN THE INDUSTRY AND YOU'VE LUCKED OUT -YOU DIDN'T MISS IT. REGISTER NOW & WE'LL SEE YOU IN SEATTLE. FOR MORE INFO CALL S★TJ AT 609/662-12080 OR FAX US AT 609/662-0537.

## STAR★TECH Journal Article Index Database

Now, You Don't Have To  
Thumb Through That  
Worn, Torn, Dog-eared  
Set of Indexes Anymore!



Just by pressing a few keys you can access S★TJ's **complete database of information** by manufacturer, model or type. This is a very user-friendly program with a pop-up window system for ease of use & on-line help screens.

Designed for Coin-op Service Managers, Field Techs, Shop Techs or anyone who needs to find game service information fast! Use the **Multi Search Locator** function to find what you need, print the list or print a query form and mail or fax it to S★TJ for reprints of those articles you might be missing. What could be easier!



Every article ever published by *STAR★TECH Journal* is indexed in this self-loading database, from the first issue in Volume One (Mar79) to the current volume. Updates every 12 months with the first one *free* when you return your registration card. **Act now! Introductory price \$49.95. After Oct 1, '91 \$69.95.**

### S★TJ Article Index Database v2.0

Please send \_\_\_\_ disks @ **\$49.95** (+ 4.50 s/h)

Name: \_\_\_\_\_

Company: \_\_\_\_\_

Address: \_\_\_\_\_

City, State, Zip: \_\_\_\_\_

Specify: ☐ 5-1/4" (360K) or ☐ 3-1/2" (720K) Disk

**System Requirements:** 8088, 80286, 80386 compatible computers. 384K memory. Dos 3.0 or above. MGA, CGA, EGA or VGA graphic video system.

**STAR★TECH Journal**

PO Box 1065, Merchantville, NJ 08109

**609/662-1080**



## Industry's Worst Cue Ball

Todd Erickson  
Summit Amusements  
St. Paul, Minnesota

### PROBLEM

The worst cue ball in the Industry is being sold by Competitive Wholesalers. I purchased a box of 16 of what was explained to me as the best cue ball in the Industry for Valley Pool Tables. A trick cue ball is closer to describing this ball! These balls came in a box saying they were Valley Supreme balls. Valley says they have nothing at all to do with these balls. The box even had a cougar on it. They appear to be old boxes that had been made for Valley.

### SYMPTOM

Rolling the ball down a ramp on a 10' table, the ball will roll as much as 1-1/2' to the left or right or even straight depending on how it is placed on the ramp. The best part of this is that Competitive Wholesalers would not stand behind their product past 30 days!

I don't generally check ball roll on balls that I receive. But these are so bad that I had players telling me! I would not run these balls under any circumstances.

## Betson Crane Meter Drive Diodes

Dave Bushey  
Russell Hall Vending  
Holyoke, Massachusetts

### PROBLEM

I thought I'd share this unique problem in the hopes that it saves somebody else troubleshooting time. We switched to using meters on all our games recently for bookkeeping purposes, and of course, alot of them didn't work.

### SYMPTOM

Most of the problems were faulty meters, broken wires, etc. except for the *Betson Crane*.

### SOLUTION

The problem with the crane, though, was that the diode that is installed on the collector of TR-4 (the drive transistor for the coin meter) was installed backwards. I changed it and installed it correctly and now the meter works great.

### NOTE

By the way, this crane has the large pc board in the bottom of the machine as opposed to the small board in the coin entry door area.

---

## Data East Pin Celebrates 5 Yr Anniversary

Gary Stern, Joe Kaminkow and Shelly Sax celebrate the 5 year anniversary of the formation of Data East Pinball. 5 years ago at the AMOA, DEP was born under the watchful eye of T. Fukuda.

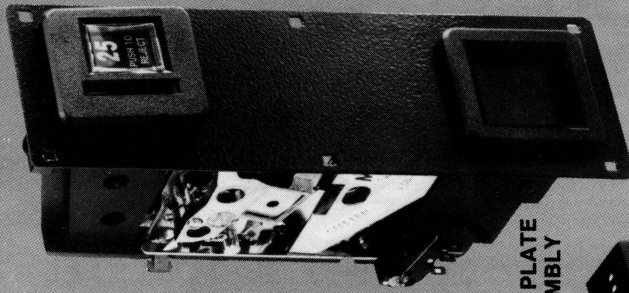
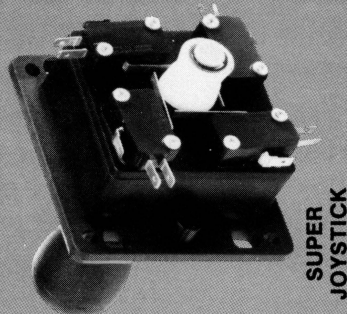
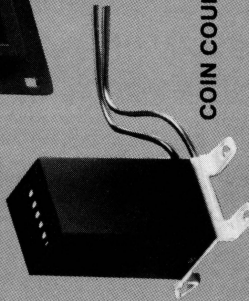
Today, employing more than 300 employees and about to debut their new model *Batman*, they celebrate a great 5 years of growth and technical innovation such as the Dot Matrix Display and the Solid State Flipper.

About to have their cake and eat it too, Gary Stern says, "You ain't seen nothin' yet!"

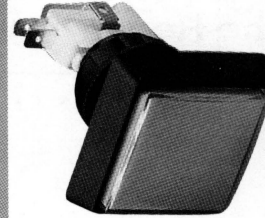
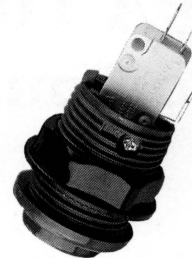
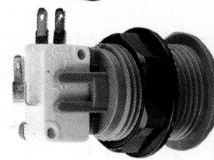


# HAPP CONTROLS

- dependable delivery and service
- unequalled precision and quality
- competitively-priced

FRONT PLATE  
ASSEMBLYSUPER  
JOYSTICK

COIN COUNTER

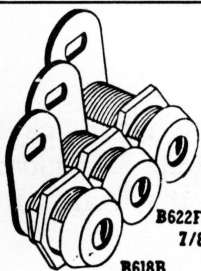
ILLUMINATED  
PUSHBUTTONSVERTICAL  
PUSHBUTTONSHORIZONTAL  
PUSHBUTTONS

## HAPP Controls, inc.

Manufacturers of Electronic Controls

106 Garlisch • Elk Grove, IL 60007 • 708-593-6130  
FAX: 708-593-6137 • TELEX: 297249 CONTROLS UR

Call or write for fully illustrated catalog of standard and custom joystick controls, driving, coin/currency and trackball controls, or, send your specifications.



### L.A.I. Series 600 High Security Locks Virtually Pick-Proof

High-Security  
Cam Locks, Padlocks and  
T-Handle Locks At Prices  
You Normally Pay  
For  
Ordinary  
Locks!

S670D

REMOVABLE CORE  
STAINLESS STEEL  
SHACKLELESS PADLOCK  
2 1/4" (70mm)

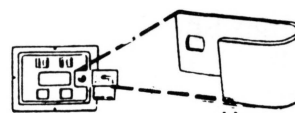
S570D

N601K  
N603KB655A  
2 1/4" (55mm)B645A  
1 1/4" (45mm)B630E  
1 1/4" (30mm)

Coin \$695

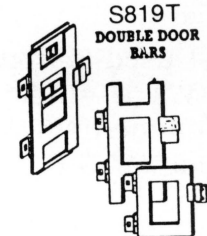
Counter

Sorter \$995



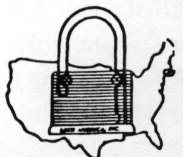
Coin Box Protection  
at a Reasonable Price

video  
game bar  
S807T



S819T  
DOUBLE DOOR  
BARS

S  
A  
V  
E  
!



### L.A.I. Series 500 Medium Security Tubular Key Locks



S502K

1-800-422-2866

## LOCK AMERICA, INC.

Tel. (714) 373-2993

Fax (714) 373-2998

7251 "M" Garden Grove Blvd., Garden Grove, CA 92641



# TICKET TOOLBOX

For The Repair And Modification Of Redemption Games

Vic Fortenbach • United Artists • Palm Springs, California

## Adding A Ticket Advance Push Button To Your Redemption Games

### SUBJECT

A ticket advance push button has, until recently, been omitted from previously mfg ticket dispensers. When installed, this button makes it easier to load tickets into the dispenser. Installation of this unit is a snap, so no problems should be encountered.

### DELTRONICS PROCEDURE

To add an advance button to the Deltronics model DL-1275 dispenser. (Used in *Skee Ball*, and many other games.)

- Locate the white motor enable wire on the dispenser. (Pin 3 on the white molex connector.)
- Cut this wire so a push button or momentary toggle switch can be added to the cut in the wire. Depending on the game, you might have to extend these wires to a new location; perhaps next to the ticket meter.

### SOURCE

The switch I used is from Radio Shack (where else!) and it's a single pole, double throw (S.P.D.T.) momentary toggle switch. Radio Shack Catalog # 275-619. Connect the switch as shown.

The switch from Radio Shack is a miniature type so it can be mounted into a 1/4" hole drilled just about anywhere! The mounting "bracket" I used for the switch, was the flange of the ticket bin (on *Skee-Ball*) or you can use a piece of metal bent to a right angle.

### OPERATION

The toggle switch must be held "on" to advance the tickets. When the switch is released, the ticket dispenser (and the game) will function normally.

### NOTE

If this switch is installed on a *Skee-Ball*. DO NOT push the switch while the game is vending tickets. The game will instantly turn to ashes in a blinding light (just kidding!) But an error message will result!

### TROUBLESHOOTING

*Problem:* After you install this switch, the ticket dispenser continually vends tickets. *Solution:* Reverse the two outer wires on the switch to correct this problem.

A video game control panel micro switch can also be used. But be aware of its size and mounting restrictions.

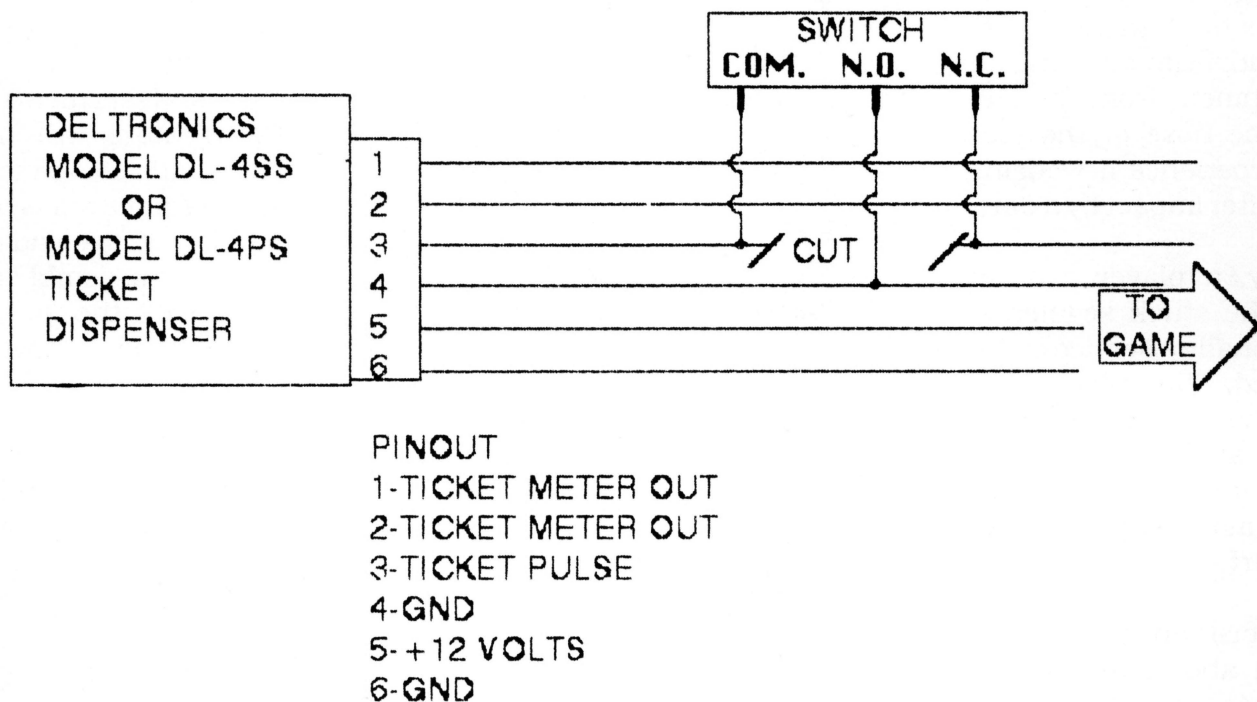
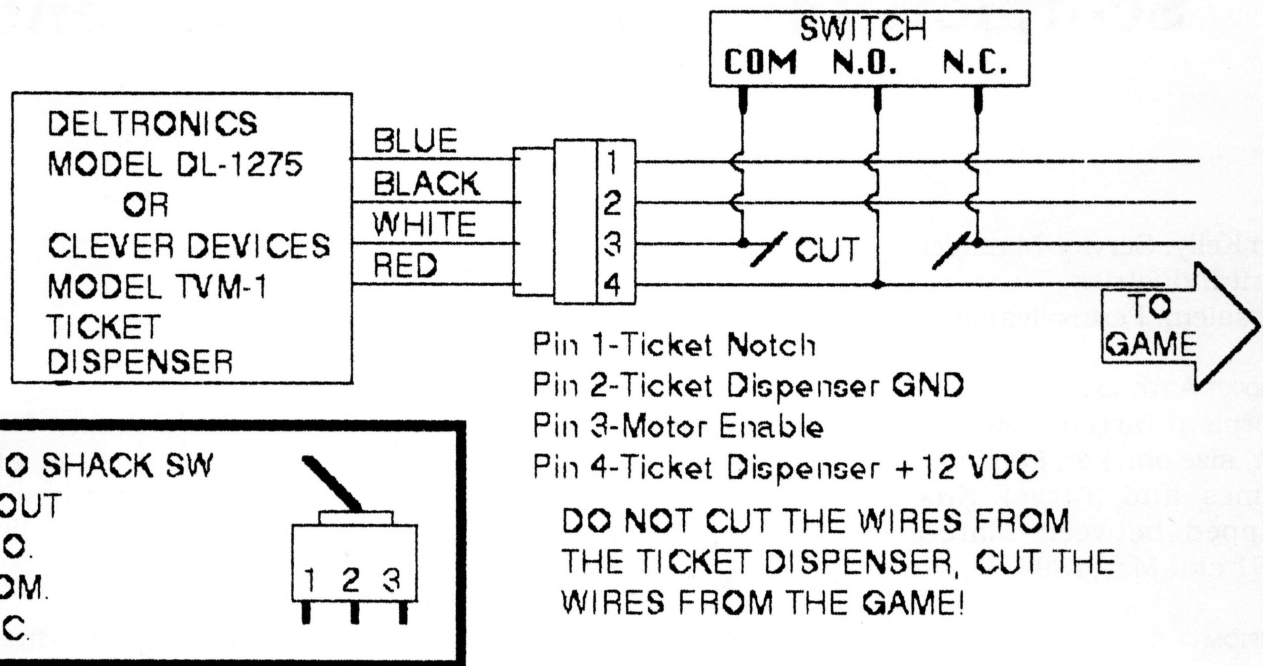
### PROCEDURE DELTRONICS 6-PIN

To add a ticket advance push button to a Deltronics model DL-4SS or DL-4PS ticket dispensers (These dispensers have a 6-pin angle connector instead of a 4-pin molex plug.)

Follow the connection diagram to hook up the push button to either type of ticket dispenser.

### NOTE

Deltronics is now shipping the DL-1275 ticket dispenser with a ticket advance button already installed.





# Merit Pub Time

## Scorpion Targets Sticking Segments

Jim Kelly, Service Manager  
Merit Industries  
Bensalem, Pennsylvania

### PRODUCT AFFECTED

Scorpion Targets ("American" size only) on *Pub Time* Games and Target Kits shipped between March 1991 and May 1991.

### SYMPTOM

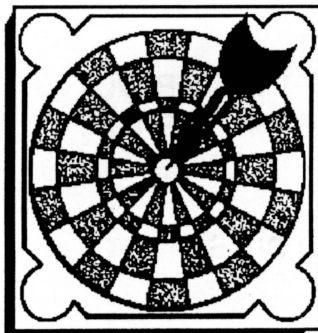
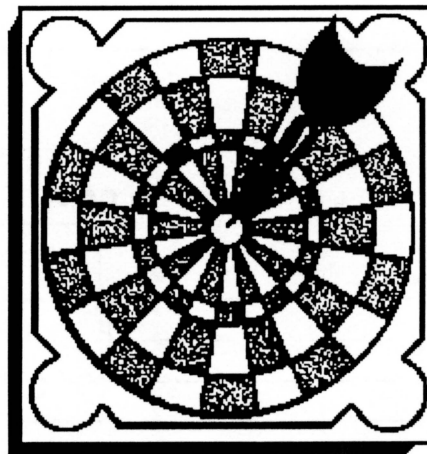
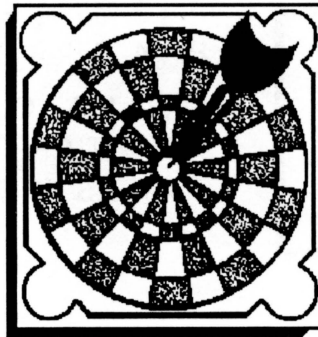
Sticking of "pie" shaped segments near the pointed end (towards bullseye), sticking of some "block" (single score) segments.

### DESCRIPTION

Due to accumulation of tolerances, some of which occur due to changes in spiders and segments long after shipment from the factory, the nose of the pies may experience a wedging effect after impact by a dart.

Usually, a player can release the stuck segments, occasionally a service call is required. The block segments have shown on occasion a slight interference which affects the smoothness of motion upon impact by a dart.

All occurrences as described above, or similar, have been identified and corrected by modification



to the molds. Precision tolerance parts, allowing for normal material changes in the field after shipment, are now assured.

All targets with the above problem persisting (i.e., normal wear-in has not alleviated the interference) should be replaced, and are covered under Merit warranty.

### CORRECTIVE ACTION

Merit Industries will replace, at no charge to the operator, all defective spiders and segments. Merit Distributors will be supplied with complete spider and segment assemblies. Simply remove and discard the older assembly and replace with the new target. No new matrix switch assembly is required.

Contact your local Merit Distributor or call Merit Customer Service at 800/445-9353.



## HOT TIPS I

### Bench Tech

#### HOT TIPS I: Bench Tech

Keep this valuable reference manual nearby on your workbench—you *will* use it! A compilation of "hand picked" STAR★TECH Journal articles plus additional time-saving tech tips from service managers around the country. Arranged by game manufacturer, alphabetically. Special plastic comb binding allows handbook to lay flat on your bench, freeing both hands for the job. And sized at 5-1/2" x 8-1/2" it won't clutter your work area. \$29.95.

## HOT TIPS II

### Field Tech

#### HOT TIPS II: Field Tech

Don't leave home without it! Just like *HOT TIPS I: Bench Tech*—except for this special issue manual, we had veteran field service people select the most helpful STAR★TECH Journal articles and add some of their own great tech tips! Geared toward the tech/mech doing service on location, as opposed to shop repair with the luxuries of time and resource materials. Arranged by game manufacturer, alphabetically. Special plastic comb binding allows handbook to lay flat, freeing both hands for the job. This sturdy 5 1/2" x 8 1/2" handbook will fit comfortably into your toolbox. \$29.95.

#### SERVICE MANUAL ORDER FORM

Rush me \_\_\_\_\_ **HOT TIPS I: Bench Tech** \$29.95

Rush me \_\_\_\_\_ **HOT TIPS II: Field Tech** \$29.95

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City/State/Zip: \_\_\_\_\_

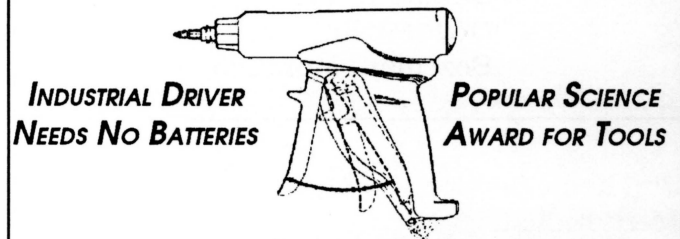
☐ **Payment Enclosed**    ☐ **COD**

Please include \$3.50 s/h. NJ add 7%.

Mail coupon to: STAR★TECH Journal, PO Box 1065,  
Merchantville, NJ 08109. Phone: 609/662-1080.

## SqueezeDriver

High Speed Precision Screwdriver



- **Powerful** 140 in. lbs. Ratchet Torque
- **Fast** 200 rpm avg. Faster than many cordless
- **Reversible Drive**
- Complete with Slotted and Phillips Drives
- Unconditional Two Year Warranty

**Specifications:** Made of High Impact ABS plastic. Drop tested to 10' on fully hardened concrete. Size: 7.75"x6.5"x1.5". Takes standard 1/4" hex bit types. Weight: 15 oz. Made in USA.

**\$24.95**

### SqueezeDriver Accessories

#### 12 Piece Drive Bit Set

**Includes:** Phillips #1, #2, #3. Slotted #5/#6, #8/#10. 1/4" Drive Socket Adapter. Sockets 3/16", 1/4", 5/16", 3/8". T-10, T-15.

**\$7.95**

#### Order Form

Please send \_\_\_\_\_ **SqueezeDrivers** @ \$24.95  
& \_\_\_\_\_ **12 Pc Drive Bit Sets** @ \$7.95

Name: \_\_\_\_\_

Company: \_\_\_\_\_

Address: \_\_\_\_\_

City/State/Zip: \_\_\_\_\_

Add \$4.50 s/h per order. NJ add 7%.

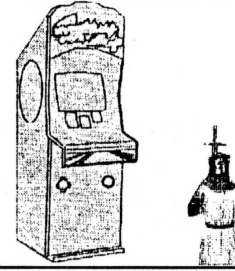
Send orders to:

**STAR★TECH Journal**  
PO Box 1065, Merchantville, NJ 08109.  
**609/662-1080.**



## Prince's Corner

Donald B. Prince  
D&R Music  
Bozeman, Montana



## Evaluating SNK's NEO•GEO Conversion Kit System

*Video Games sure have come along way from the first games. X-Y monitors have been replaced by raster-scan monitors. Linear power supplies have been replaced by switch-mode power supplies with standard voltages of 5vdc, 12vdc, and -5vdc. Wiring has become standardized (JAMMA harness) and color coded. Even lighting has become a standard 15" fluorescent lamp.*

*All these improvements have one thing in common, standardization. Standardization has made it practical to have a standard test bench (JAMMA compatible) rather than a test bench for each type of game. It has also made modular changes possible.*

### VS SYSTEM

Nintendo tried a universal type system with it's VS Unisystem, where you could change from one game to another by a chip change, a header (or marquee) change, and possibly a front panel change. This system has made these games valuable (in certain locations) even today. Unfortunately, the technology grew and the graphics became so-so in light of the new.

### NEO•GEO

SNK Corp. introduced it's version of systematic video games (NEO•GEO) in 1990 and has taken the systematic approach to it's next logical step, games in a cartridge. A convenience adapted from the home video market. If you were unhappy with the longevity of the VS Unisystem

(Nintendo) and it's limited game selection, don't let that turn you off from exploring the NEO•GEO. SNK has taken steps to insure the NEO•GEO will be profitable now and in the future.

### TITLES

According to *Canadian Coin Box's* game poll, as of April '91, NEO•GEO is still in the top 10 in Canada. In America, *Replay Magazine's* "The Players Choice" section (May '91), lists seven of fifteen possible NEO•GEO titles in their Top 25, under the heading best software. Four titles have been on the charts for 5-7 months (good indicator of long range profitability), and three recent released titles (1-2 months on the charts) are in the top ten, including the number 2 and 3 spots (good indicator of high profits on initial investment). Refer to the list at the end of this article for game titles.

SNK Corp. puts out three dedicated NEO•GEO video systems: 6 game/2 player, 4 game/2 player, and 2 game/2 player. They also licensed Romstar to put out a JAMMA compatible conversion system with one game title, 2 players.

### CONVERSIONS

Changing games is as easy as turning off the game, replace the game cartridge, replace the marquee title card, and turn the game back on. The advantage the NEO•GEO has over the Nintendo VS Unisystem is in having a universal

---

*Be sure you select your conversion cabinet first before ordering, so you can select the right size front panel. There are 7 front panel sizes to choose from!*

---

front panel (standardization a big advantage), no new overlays or button changes. You also don't have to take the board out to change games, like the Nintendo *Unisystem* (if you put the board in the cabinet in a good location). The marquee is easy to change, just unscrew and change title cards. All done on location and can be done by non-technical personnel. Now for the likes and dislikes.

#### PROS

The good news first. • I liked the stereo sound and the idea of a personal headphone jack. Any location that doesn't want to hear the attract sounds would love this feature too. • I like the universal front panel and the plexi top. Be sure you select your conversion cabinet first before ordering, so you can select the right size front panel. (There are 7 front panel sizes to choose from.) This will avoid having to redrill a new front panel using the plexi as a guide. • I liked the software accounting and diagnostics, as well as the how-to-play on screen help (also comes with how-to-play cards for the bezel or front panel). • I also liked the ease of changing games, and the many titles.

#### CONS

Now for the dislikes. • I didn't think the marquee L.E.D. harnesses were long enough to accommodate a tall cabinet (I guess that's being worked out). • I didn't like that the headphone output is not short-protected, I can just see someone sticking a paper clip in the headphone jack and taking out the audio. (This can be avoided by adding a protection circuit or fuse of your own, though.) • I would also like a protective plexi that can be replaced if burned by smokers. On

*NEO•GEO*, the universal plexi would be more expensive to replace than standard plexi you can get anywhere.

In summary I'd like to say this is a pretty complete system. It's simple, simple, and simple. Simple to change game cartridges, no harder to convert than any other conversion kit, and lots of top money making games to choose from. This system will be around for years to come, without becoming obsolete. With it's 16 bit processing, 64 mega-byte memory, 3D scrolling background, and low cost software cartridge (around \$400), this system will endure. The bottom line looks good for the *NEO•GEO* system.

- 1) *Nam-1975*
- 2) *Magician Lord*
- 3) *Top Player's Golf*
- 4) *The Super Spy*
- 5) *Cyber Lip*
- 6) *Ninja Combat*
- 7) *League Bowling*
- 8) *Baseball Stars*
- 9) *Riding Hero*
- 10) *Blues Journey*
- 11) *Sengoku\**
- 12) *Alpha Mission II\**
- 13) *Ghost Pilots\**
- 14) *Burning Fight\**
- 15) *King of the Monsters\**

\* Notes new release



## Williams System II Diagnostics

John Michael Bevar  
Ries Amusement Inc.  
Denison, Iowa

### PROBLEM

When powering up or beginning the self test on a *Pinbot*, the "Adjust Switch ##" came up indicating a problem. After fixing the problem, the "Adjust Switch ##" continues to come up on power-up or at the beginning of the self test.

### CAUSE

Well, I tell you, after 5 hours of searchings, parts swapping and a few choice words, I found it. But it wasn't hardware related, it was software related!

That's right, Williams *System II* games have a NEW capability to aid the operator and service personnel. I quote, "at the beginning of Test/Diagnostic or game Power-Up, a display now signals when a switch has NOT been actuated during ball play for a lengthy period of time (60 balls or 20 games)."

An Auto/Diagnostic Test that keeps track of and stores a switch's actuation and then tells you if it has a problem. That's great but, how do you clear it when you have found the problem?

### SOLUTION

After searching through the manual with no luck, I found out that you must use the option "Install Factory Settings" to clear it. In self test, go to "AD 70 Install Factory," enter "Yes", then press Advance, the system is cleared.

Remember... this will set everything to factory settings, you will need to reprogram if necessary.

### AMOA Las Vegas Expo

September is our show issue.

Advertisers and contributors please note that our deadline for this important issue is August 20th.

## BECKMAN CAPT6 DIGITAL TEST METER

### VERSATILE CAPACITANCE & PARTS TESTER

- 24 USER RANGES
- TEST CAPACITORS TO 20,000 MFD
- RESISTANCE & CONTINUITY
- DIODES • TRANSISTORS
- LEDs • BATTERIES

**\$95**

Send Orders to:

**STAR★TECH Journal**

PO Box 1065, Merchantville, NJ 08109.

Add \$8 s/h. NJ add 7%. 609/662-1080

### ➤ ELECTRONIC BULLETIN BOARD

The only full-time BBS dedicated to the Coin-Op Industry. *STAR★TECH Journal* offers this service free to all subscribers. All you need is a computer and a modem to access this info-packed service.

If you are interested, you may contact the board 24 hours a day at: 404/631-2928 (2400/1200/300 baud, 8 data bits, 1 stop bit, no parity). After the system connects, just follow the prompts. You can leave any questions or special requests in a message to *STAR★TECH Journal* or to the Sysop.

### BACK VOLUMES/ISSUES

Certain back issues are available. Complete volumes \$42. Single issues (current year only) \$5. Add \$3.50 s/h.

#1	(Mar79-Feb80), 12 iss/144 pp.
#2	(Mar80-Feb81), 12 iss/144 pp.
#3	(Mar81-Feb82), 12 iss/188 pp.
#4	(Mar82-Feb83), 12 iss/256 pp.
#10	(Mar88-Feb89), 12 iss/296 pp.
#11	(Mar89-Feb90), 12 iss/288 pp.
#12	(Mar90-Feb91), 12 iss/288 pp.

Send orders to:

**STAR★TECH Journal**

PO Box 1065, Merchantville, NJ 08109

**609/662-1080**

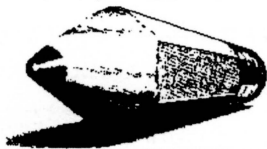
## MANUFACTURER'S NUMBERS

## Customer Service

Arachnid 800/435-8319  
 Ardac 800/321-0765  
 Atari 408/434-3950  
 Capcom 408/727-1665  
 Coin Controls 800/323-8174  
 Data East 408/286-7074  
 Data East Pin 800/ KICKERS  
 Doyle 813/366-3735  
 Drew's 803/574-0162  
 Dynamo 800/527-6054  
 Exidy 415/364-5201  
 Fabtek 206/882-1093  
 Grayhound 800/222-0491  
 Happ Cntrls 708/593-6130  
 Konami 708/215-5100  
 Kramer 800/631-2126  
 Leland 619/562-7000  
 Mars Electronics 800/345-8215  
 Merit 800/445-9353  
 Namco 408/496-6371  
 Nichibutsu 213/408-0518  
 Nintendo 800/628-4126  
 Premier 800/444-0761  
 Rock-ola 708/629-9200  
 Romstar 213/539-2744  
 Rowe 201/887-0400  
 Seeburg 800/LaserCD  
 Sega 408/435-0201  
 Sharp Image 800/448-8100  
 Skee Ball 215/362-0300  
 Smart 800/553-2442  
 SNK 408/736-8844  
 STAR★TECH 609/662-1080  
 Taito 708/520-9280  
 Tecmo 800/338-0336  
 Tradewest 214/874-2683  
 UBI 800/526-0080  
 Upstate 803/879-0725  
 Valley 800/248-2837  
 Wells Gardner 312/252-8220  
 Wico 800/367-9426  
 Williams/Bally 312/267-2240

## Fax

Arachnid 815/654-0447  
 Ardac 216/942-1835  
 Atari 408/434-3945  
 Capcom 408/496-6679  
 Coin Cntrls 708/228-1833  
 Data East 408/971-0722  
 Data East Pin 708/345-7718  
 Doyle 813/366-5197  
 Drew's 803/574-7680  
 Dynamo 817/284-7606  
 Exidy 415/364-5286  
 Fabtek 206/883-8038  
 Happ Cntrls 708/593-6137  
 Konami 708/215-5144  
 Kramer 201/367-3684  
 Leland 619/562-9468  
 Mars Electr 215/430-2694  
 Merit 215/639-5346  
 Namco 408/496-6399  
 Nichibutsu 213/408-0208  
 Nintendo 206/882-3585  
 Premier 708/350-1097  
 Rock-Ola 708/628-0019  
 Romstar 213/539-3626  
 Rowe 201/887-2399  
 Seeburg 708/543-0549  
 Sega 408/435-0294  
 Skee Ball 215/362-0569  
 Smart 515/265-3148  
 SNK 408/736-0446  
 STAR★TECH 609/662-0537  
 Taito 708/520-1309  
 Tecmo 213/329-6134  
 Upstate 803/879-8536  
 Valley 517/892-6513  
 Wells Grdner 312/252-8072  
 Wico 800/446-9426  
 William/Bally 312/267-3747



*GamesService*

## COIN-OP MAIL LIST RENTAL

The best just got better! Names not responding to direct mail eliminated. List of coin-op names/companies is available on Cheshire Lables (or Pressure Sensitive) with Title Addressing. Call for State totals and pricing. Updated (additions/deletions/corrections) regularly. Guaranteed 93% deliverable. STAR★TECH Journal, POB 1065, Merchantville NJ 08109. Phone: 609/662-1080. Fax: 609/662-0537.

STAR★TECH Journal neither operates, distributes nor manufactures coin-operated equipment. It's sole purpose for being is to compile technical and informational data considered valuable for dissemination to its paid subscribers. Comments or suggestions pertaining to this service are welcome.

## STAR★TECH Journal Subscription Form

## NEW SUBSCRIPTION:

Please initiate my subscription to  
 STAR★TECH Journal for the period indicated:  
 (U.S. funds, please.)

## USA:

☐ 1 Yr \$67      ☐ 2 Yrs \$121      ☐ 3 Yrs \$181

## Canada:

☐ 1 Yr \$76      ☐ 2 Yrs \$137      ☐ 3 Yrs \$205

## Other Countries: (via Air):

☐ 1 Yr \$120      ☐ 2 Yrs \$216      ☐ 3 Yrs \$324

Company: \_\_\_\_\_

Attention: \_\_\_\_\_

Address: \_\_\_\_\_

City/State/Zip: \_\_\_\_\_

☐ Payment Enclosed      ☐ Bill me later

Mail coupon to: STAR★TECH Journal, PO Box 1065,  
 Merchantville, NJ 08109. Phone: 609/662-1080.



## MARKETPLACE

*A monthly listing of available coin-op sales and services seen by over 2,000 amusement machine operators. Place your ad for timely results with economical prices.*

**MARKETPLACE** prices are \$0.65 per word. Minimum advertisement is \$13.00 or twenty words. Please include full mailing address if not indicated in ad.

**DEADLINE:** The 20th of the previous month. (Example: August 20th for the September issue). Phone: 609/662-1080. Fax: 609/662-0537. Bbs: 404/631-2928.

**ROWE AMI COMBO JUKEBOX UPGRADE:** Why pay big bucks! We can save you money on the PDM-430 CD player universal. Call for details call 609/588-5338 or fax 609/588-5460. L&M ELECTRONICS.

**GOTTLIEB PINBALLS:** System I, 80 & 80A boards repaired. Most boards & proms in stock. Lots of misc parts. We are the Gottlieb specialists. Call PINBALL CONNECTION 407/249-1022.

**MONITOR GET WELL KITS.** Saves time and money on monitor repairs. Kit #101: Eliminates most problems with the Electrohome GO-7 monitors (warping, blacking out, smearing, etc.). 17 parts. \$7.95 each. L/10 \$6.95 each. Kit #201: Eliminates most problems with the Wells Gardner K4600 Series monitors (warping, brightness problems, etc.) 14 parts. \$6.95 each or L/10 \$5.95 each. Kit #301: For Nintendo color monitors (Sanyo). Eliminates vertical shrinking, jail bars, low brightness, etc. \$6.95 each or L/10 \$5.95 each. 2SD870 \$4.49 each. Money back guarantee! We pay S&H! ZANEN ELECTRONICS. 806/793-6337.

**JAMMA SALE!** COD/MC/VISA 716/838-3038 order 24 hrs. Fax 716/834-3233. JOHNSTON'S GENERAL STORE, 11 Greenfield, Buffalo, NY 14214. Atomic Runner/Chelnov/Data East \$195. Bad Dudes/Dragon Ninja/Data East \$350. Double Dragon \$195. Double Dribble/Konami \$75. Galaga '88/Namco \$495. 1943/Capcom \$195. Ninja Emaki/Nichibutsu \$95. Ninja Gaiden/Tecmo, \$295. POW/SNK \$195. Renegade/Technos \$195. Robocop/Data East \$350. Rolling Thunder/Namco, \$250. Sky Shark/Flying Shark/Taito \$295. Tiger/Taito \$495. Twin Cobra/Romstar \$495. Top Gunner/Konami \$95. V-Ball/Technos \$195. Vigilante/Data East \$195.

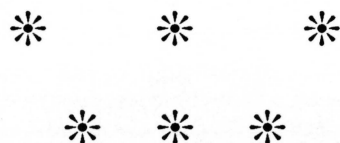
**NEW MONITOR BOARDS!** Need a new flyback? Don't waste your time. \$109.95 for complete new board by EYGO with 1 year warranty. Various models to convert your dead or continually problemed monitors. Revive your Electrohome, Hantarex, Wells Gardner and more. Try one! BESTCO INTERNATIONAL 214/986-9008. Fax: 214/255-4007.

**EXPERIENCED TECHNICIAN** wishes to return home to Florida. Experienced all areas Coin-Op including Pokers, Monitors and Jukeboxes strong points. Also, restore antique jukeboxes and slots. TECHNICIAN Box 9694, Asheville, NC 28815. Phone 704/298-9751.

**USED GAMES FOR SALE.** Videos, Pins, Cranes, pulled PCBs and Headers. All in good shape and ready to move. Call KEMP ENTERPRISES for pricing and delivery info at 203/282-7396.

**PIONEER/SONY PLAYERS REPAIRED.** We repair all types of units. Seeburg, Rowe, Rockola, NSM. CD and Dragon's Lair, Space Ace units. Fast turnarounds. All work guaranteed! Call for rates or fax for information Main office 609/588-5338. Fax: 609/588-5460. L&M ELECTRONICS INC.

**ANTIQUE & MODERN PAYPHONES:** Old black 3-slotter, nice, working \$995 or required quarters elaborate \$305. Also old time signs \$12. 608/582-4124.





# STAR★TECH Journal's ADVANCED TROUBLESHOOTING Service Manual



**Section I** *Introduction* Soldering Equipment, Digital Mutimeters, Logic Probe, Transistor Tester, Oscilloscope, Logic Analyzer, CPU Emulators.

**Section II** *Electronic Components* Diodes, Diode Parameters, Transistors, Transistor Parameters, Zeners, Zener Parameters, Resistors, Resistor Types, Capacitors.

**Section III** *Power Supplies* Linear/Switching Comparison Chart, Linear Supplies, Fixed Terminal Regulator, Series Pass Regulator, Failure Modes, Crowbar Circuit, Modifications, Switching Supplies, Pulse Width Modulation, Common Mistakes, Troubleshooting Checklist.

**Section IV** *Monitors* Common Errors, Rules of Thumb, Wells Gardner K7000, Common Problems, Hantarex MTC9000, Common Problems, RGB Generator.

**Section V** *Digital and I/O* Integrated Circuits, 7400 TTL, 4000 Series, Hybrids, Information Sources, Switch Input Circuits, Switch Matrix, Analog Multiplexer.

**Section VI** *Microprocessors* Embedded Controllers, Busses, 68000, Z80, 6502, NOPs.

## SERVICE MANUAL ORDER FORM

Rush me \_\_\_\_ **ADVANCED TROUBLESHOOTING** @ \$49.95

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City/State/Zip: \_\_\_\_\_

☐ **Payment Enclosed**    ☐ **COD**

Please include \$3.50 s/h. NJ add 7%.

Mail coupon to: STAR★TECH Journal, PO Box 1065,  
Merchantville, NJ 08109. Phone: 609/662-1080.

stj

# Best of STAR★TECH Journal SWITCHING POWER SUPPLIES Service Manual



**New! Just Published.** *All about Switching Power Supplies.* From the very beginning! Switchers are covered from when they first appeared in our Industry up to the current models and uses.

**Theory and Circuit Analysis.** Voltage Measurements, Substitute Parts and Failure Modes.

**Modifications.** Getting negative voltages from positive-only switchers, Identifying power legs on ICs, Capacitor Replacements.

**Troubleshooting.** *Peter Chou, Condor, Wico, Power Plus, Nintendo, Sieracin, HiTron, Penn-Ray.*

**Never before published** information outside of our journals. This info can not be found in any of our current service manuals.

*So, if you're looking for the definitive word on Switching Power Supply servicing and repair, this is it. Now, you can determine if that switcher is repairable or simply not worth your time. Look up the symptom, perform the solution and you're back in business. Take another look at that pile of useless supplies in the corner of your shop — are they really beyond help? Maybe not!*

## SERVICE MANUAL ORDER FORM

Rush me \_\_\_\_ **SWITCHING POWER SUPPLIES** @ \$29.95

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City/State/Zip: \_\_\_\_\_

☐ **Payment Enclosed**    ☐ **COD**

Please include \$3.50 s/h. NJ add 7%.

Mail coupon to: STAR★TECH Journal, PO Box 1065,  
Merchantville, NJ 08109. Phone: 609/662-1080.

stj



# STAY AHEAD of the GAMES

## Seminars For The Advancing Game Technician

NEW

### UPDATED CLASS OUTLINE

NEW

**The Program...** After more than a year of touring the Continent with the Coin-Op Industry's only Seminar Program for Advancing Game Technicians, we've "Tailor Fit" our program for the technician of the 90's. Now, there's more of what you want and need to stay ahead of the games. We change with the technology. These sessions are designed to advance the service person in the skills of troubleshooting Coin-Op equipment.

#### TEST EQUIPMENT

- TYPES OF TEST EQUIPMENT • ADVANTAGES OF EACH OVER THE OTHER • SPECIAL TYPES OF TEST EQUIPMENT YOU CAN BUILD • ABSOLUTE NEED-TO-KNOW FORMULAS AND TABLES FOR THIS INDUSTRY.

#### SWITCHING POWER SUPPLIES

- THEORY OF OPERATION • TROUBLESHOOTING AND REPAIR.

#### MONITORS

- THOROUGH COVERAGE OF OPERATION • COMMONLY ENCOUNTERED PROBLEMS WITH EIGHT MONITORS COMMON TO THIS INDUSTRY • TIPS AND TRICKS WHEN WORKING WITH MONITORS.

#### LOGIC BOARDS

- TYPICAL ORGANIZATION OF LOGIC BOARDS • NUMEROUS PROBLEMS THEY CAN PRODUCE • SOFTWARE PROBLEMS - HOW TO RECOGNIZE THEM • PROCEDURES FOR OVER-VOLTAGE DAMAGED BOARDS.

#### INFORMATION & REGISTRATION HEADQUARTERS

STAR★TECH Journal, PO Box 1065, 18 North Centre Street, Merchantville, NJ 08109. 609/662-1080. Fax: 609/662-0537.

**TUITION:** Advance registration is \$250 per person. There is a 10% discount for multiple registrations from the same company. Classes are limited --register now! Late Registration is \$275 (less than seven days prior to seminar date).

**REGISTRATION INFORMATION:** Each person may register by selecting the Seminar date & site of their choice and by sending this information along with their name, company, address, phone number and tuition payment to the registration headquarters listed above. Make checks payable to STAR★TECH Journal, Inc.. Information packages including hotel accommodations & class schedule will be sent upon receipt. Class hours: Saturday: 9:00 am - 4:00 pm (6 hrs class), Sunday: 9:00 am - 4:00pm (6 hrs class). Certificate of Completion awarded.

#### SUMMER '91 DATES & SITES:

Aug 10/11	STAR★TECH	San Francisco
Aug 17/18	Mount. Coin Dist.	Las Vegas
Aug 24/25	Cleveland Coin	Detroit
Sep 7/8	Music Vend Dist.	Seattle
Sep 28/29	STAR★TECH	Atlanta

*Don't miss it!*

*Two full days (Saturday / Sunday)  
of inside repair tips and hands-on labs.*

► **INTERESTED DISTRIBUTORS:** For information on sponsoring this Industry Seminar program in your area: Contact STAR★TECH Journal, 609/662-1080. Fax: 609/662-0537.